REMARKS

New claims 87-89 are submitted herewith and indicate that catalyst includes sulfur or sulfate or that the sulfur content in the catalyst is from 0.1 to 20% by weight. These claims are supported by the specification, at least, for instance, on page 7, lines 1-10 and page 8, lines 8-11 of the specification. These claims are believed allowable over the cited references.

The rejection of claims 40-51 and 79-86 under 35 U.S.C. § 112, as allegedly lacking written description, is respectfully traversed. The Office Action asserts the Claims 40-51 and 79-86 lack written description under 35 U.S.C. § 112, because there is not sufficient support for a decomposition rate of 80% to 100% (Claims 40, 48, 80, and 81), or 95% to 100% (Claim 83). This rejection is respectfully traversed.

The recent Office Action states that support for 100% was shown for the decomposition of C_3F_8, but not for other species under examination. However, Figure 9 and page 39, lines 15-19 shows that for CF_4, the decomposition rate reached 100%. Furthermore, Example 11 and page 40, lines 25-26 in Example 10, as well as Example 11 and page 41, lines 12-13 show decomposition rates of "99% or more." Figure 7 shows decomposition rates that are quite nearly 100%. Figure 12 and the related text on page 44 show decomposition rates beginning with just over 0% (for C_4F_8) and about 20% (for C_3F_8) and continuing up to 100% for both C_3F_8 and C_4F_8 using a catalyst of aluminum oxide and nickel oxide.

Claims 40, 48, 80, 81 and 83 are amended to reflect a decomposition rate of 80% or more. This limitation is believed to be adequately supported by the Figures referenced above. In particular, Applicants respectfully submit that the specification provides adequate support for a representative number of carbon and fluorine compounds, such that there is proper written descriptive support for the claim language. Reconsideration and withdrawal of this rejection are therefore respectfully requested.

The rejection of claims 40, 80 and 83 with respect to the language "greater than 0.5% and up to 10% by volume" is also respectfully traversed. These claims

are amended to reflect that the range is from 0.1% to 10% by volume. This range is supported by the specification, at least, for instance, on page 12, at lines 19-24. Reconsideration and withdrawal of this rejection are respectfully requested.

The rejections of claims as obvious over Rossin (U.S. Pat. No. 6,069,291), optionally in view of Okazake *et al.* (U.S. Pat. No. 5,151,263) and Imaura (U.S. Pat. No. 5,649,985) is respectfully traversed.

With respect to the claimed ratio of Ni and Al, the Office Action asserts that Rossin's disclosure of a range of from 0.01 to 50% aluminum oxide to one or more of several elements, including nickel. *See* page 6 of the Office Action. The Office Action admits that there is no example with nickel as a metal component. In fact, ratios of only 5% or less and 50% are provided in the examples. Given the unpredictability of catalytic chemistry, one of skill in the art would expect there to be wide variance in the usefulness of the various catalysts. Absent the disclosure of the present application, one of skill in the art would have no indication how a catalyst with Ni might behave when used at the claimed atomic ratios. Rossin's broad, unsupported disclosure, would not provide one of skill in the art any reasonable expectation of success to practice the invention as presently claimed. According, one of skill in the art is provided no motivation to arrive at the claimed invention.

The Okazake reference is offered as teaching absorption and neutralization by alkali. This reference does not make up for the failure of Rossin to teach the claim limitations discussed above.

The Imamura reference is offered as teaching that HF is water soluble and can be removed by scrubbing with water. This reference does not make up for the failure of Rossin to teach the claim limitations discussed above.

Moreover, data from comparative experiments contained in the specification of the present application and two declarations by one of the inventors (Mr. Kanno) convincingly show that the instantly claimed methods achieve superior and unexpected results of increased catalyst reactivity for an

extended period of time at high starting fluorine compound concentrations of 5,000 ppm or higher.

Specifically, Example 6 of the Specification compares various catalysts containing alumina and another element. The results are summarized in Figure 6. This *side-by-side* comparison of many catalysts showed that the two containing Ni were superior in achieving *high reduction rate* of CF compounds.

Furthermore, in his February 7, 2002 Declaration ("the First Kanno Declaration"), Mr. Kanno declared that "[o]ne skilled in the art would have expected a rapid deterioration of catalytic activity during treatment of a gas having a concentration of 5,000 ppm of a fluorine compound." This statement is supported by data contained in Rossin itself as well as by Mr. Kanno's September 12, 2003 declaration ("Second Kanno Declaration").

With the exception of Examples XV and XVII, all test runs of Rossin lasted less than 100 hours (Example I: 18.5 hours and 32.5 hrs.; Example II: 19.5 and 24.5 hrs.; Example VII: 19 hrs.; Example IX: 43 hrs.; Example XI: 17.5 hours; and Example XVIII: 78 hours.) When the catalysts were tested for an extended time period, Rossin itself showed even at a starting concentration of 500 ppm, the conversion rate of some of its catalysts dropped rapidly. For example, in Example XV, the conversion rate dropped from 90-95% in the first 20 hours to about 90% up to the first 340 hours, and below 90% after 340 hours.

In the Second Kanno Declaration, Mr. Kanno prepared a Co/Zr/Al catalyst according to Example XVI of Rossin, and compared its reactivity when the concentration of the fluorine compounds was 500 ppm vs. 5,000 ppm. The results showed that while this Co/Zr/Al catalyst was able to maintain a high conversion rate for over 99% for 2000 hours when the concentration of the fluorine compound was 500 ppm, the conversion rate dropped rapidly and dramatically (to about 35%) after just 170 hours when the concentration of the fluorine compound was 5,000 ppm.

The First Kanno Declaration further stated that a high fluorine compound concentration (5,000 ppm and above) "is typically encountered in commercial

applications rather than a lower concentration of only 500 ppm as disclosed in Rossin." The First Kanno Declaration further presented data showing that the presently claimed method using the Al/Ni catalyst achieved a high reduction rate for a much longer period of time (2000+ and 4000+ hours), representing at least a 5- and 10-fold increase, compared to the longest run of 400 hours in Rossin

Thus, the data in Figure 6 of the Specification and the two Kanno declarations, in combination, showed that Al/Ni catalysts were superior in terms of achieving a high reduction rate when *the starting CF concentration was 5,000 pm or higher*, and maintaining the high reduction rate for a longer period of time than catalysts containing other elements.

These superior results were achieved because Ni was found, surprisingly, to form a composite oxide and to *activate* the catalyst more than the other elements and maintain the high reduction rate for a longer period of time. *See, e.g.* page 10, lines 1-9 of the Specification. Rossin does not in any way teach or suggest that the reactivity (reduction rate) of the catalyst can be increased with the other elements. In contrast, Rossin merely mentioned that many metal and non-metal elements could be used to *stabilize* the catalysts. *See* Rossin, Col. 3, lines 1-7, and lines 33-41. This explains why Rossin, although mentioning Ni as one possible element out of 17 metal and non-metal elements, states that its "***more preferred embodiments***" are cerium, titanium or zirconium, ***not Ni*** (see Rossin, col. 4, lines 4-6). There is no suggestion or motivation in Rossin to specifically select nickel, nor would there have been any reasonable expectation in Rossin alone, or in combination with any other references, that an Al/Ni catalyst would be used, as in the claimed method, to achieve the superior and unexpected results of the presently claimed invention.

Further, the law is clear that applicants are not required to show unexpected results over the entire range of properties. *See, e.g., In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987) (When considering whether proffered evidence is commensurate in scope with the claimed invention, it is not required that the applicant show unexpected results over the entire range of

properties possessed by a chemical compound or composition.). Evidence that an invention possesses superior and unexpected properties in one of a spectrum of conditions is sufficient to rebut a *prima facie* case of obviousness. *Id.*

In view of the foregoing, the cited references, either alone or in combination, fail to make out a *prima facie* case of obviousness for the presently-pending claims. Further, even assuming *arguendo* the references are believed to present a proper case of obviousness, the unexpected superior results discussed above are legally sufficient to rebut any such showing of obviousness.

Still further, claim 40 is amended to recite the step of "spray washing the treated gas to neutralize or remove the hydrogen fluoride". This limitation is supported by the specification on page 13, beginning on line 26. Washing by spraying affords less of a pressure loss for the treated gas and an improved cleaning efficiency when compared with other washing methods, such as bubbling the HF gas through a water tank or performing an absorption/concentration treatment. While Rossin discloses that the HF gas is removed, the reference appears to fail to mention any specific way to do this.

Okazake does not appear to discuss washing. Imamura discloses the removal of powder dust by water spray, however this step is not performed to remove HF. Thus, the references, either along or in combination, fail to teach or suggest each and every claim limitation for claim 40 and the claims dependent therefrom (41-46, 79, 85 and 87-89).

As a result, the obviousness rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

The rejections of claims 44 and 50 as obvious over Rossin (U.S. Pat. No. 6,069,291), in view of Rosenbaum (U.S. Pat. No. 5,460,792) is respectfully traversed. The Rosenbaum '792 reference is offered as suggesting including zinc in the catalysts of Rossin '291, as Rosenbaum allegedly teaches destroying halogenated compounds using a catalyst doped with any of a variety of compounds including zinc oxide. The Rosenbaum reference does not make up for the failure of Rossin to teach the claim limitations discussed above.

Accordingly, the cited combination of references fails to present a *prima facie* case of obviousness. Further, even assuming *arguendo* the references are believed to present a proper case of obviousness, the unexpected superior results discussed above are legally sufficient to rebut any such showing of obviousness. As a result, the obviousness rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

CONCLUSION

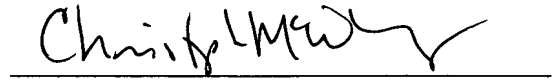
In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

Although a petition for an Extension of Time is submitted herewith, if necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket No. 056203.50311).

Respectfully submitted,

December 14, 2006



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